# EXPEDITION

THE BULLETIN OF THE UNIVERSITY MUSEUM
OF THE UNIVERSITY OF PENNSYLVANIA

*Summer* 1960

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ONE DOLLAR

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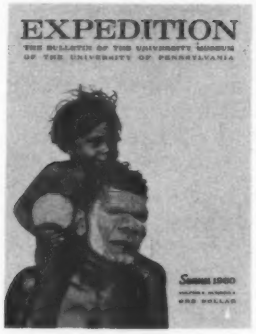


*(Cover) A Tiwi child and her father. Tiwi children are characteristically carried in this fashion, leaving the bearer's hands free. The father is painted and wears a feather ball as a sign of mourning.*

# EXPEDITION

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*Editorial*

# ARCHAEOLOGICAL SALVAGE IN EGYPT

## An Example of International Cooperation

*By* FROELICH RAINEY

At a recent meeting in the University Museum, Mrs. Nicholas Roosevelt told us that she remembered with nostalgia Sir Leonard Woolley's camp at Abu Simble near the base of the colossal figures of Rameses II. That was fifty years ago and Sir Leonard was then representing the University Museum in an earlier "crash program" for archaeological salvage in Nubia prior to the raising of the present Aswan dam.

Last month, our party from Philadelphia and New Haven was camped at the same spot, nearly two hundred miles above Aswan and just north of the Sudan border, plotting a campaign for the combined efforts of Peabody Museum of Yale and the University Museum of the University of Pennsylvania in the salvage work which must be done before the new High dam is completed. Russians and Egyptians are now very busy a few miles above Aswan on the new earth dam which will flood three hundred miles of the Nile Valley and submerge more than twenty ancient Egyptian temples as well as many unexcavated archaeological sites. The most spectacular, and the most difficult to protect, is Abu Simble, a fantastic temple cut into a rock cliff about 1275 B.C. by Rameses II to the god Amon. We landed our diesel powered patrol boat, the "Amada" (a loan from the German Archaeological Mission) at Abu Simble just at sunset and, like everyone who has seen the vast stone-cut figures of Rameses in the red glow of the desert sun, we shall remember them the rest of our lives.

There is another beautiful temple on the Island of Philae, built in Greek and Roman times, which stands just north of the present Aswan dam. In late summer when the flood gates are opened, it emerges from the waters for a brief period, but in the spring only the pylons are visible and seem to float upon the reservoir. When the High dam is finished, it will remain permanently submerged in the reservoir between the two dams. This temple could be saved by relatively small coffer dams which would isolate from the waters the Island of Philae and six hundred acres of rich land.

The Governments of the United Arab Republic and the Sudan have asked the rest of the world to assist them in preserving such world-famed monuments in Nubia and in excavating ancient sites which, with the building of the dam, will be lost for all time. UNESCO has organized an international campaign for recording, preservation, and excavation, and now several nations have moved in with survey parties, engineers, and archaeologists to do what they can in the next few years before Nubia becomes a vast lake.

There is a clause in the Mutual Security Act of the United States for 1960 which makes it possible for the President of the United States to allocate some of the so-called counterpart funds now in Egypt for the international archaeological salvage program. There is also a U. S. Committee for the Preservation of the Nubian Monu-

ments. Three American institutions, the Oriental Institute in Chicago, Peabody Museum at Yale, and the University Museum, have announced their intentions to carry on excavations in the threatened area. Thus Americans have expressed their concern, with other nations, at the possible loss of cultural monuments and historical data that are irreplaceable.

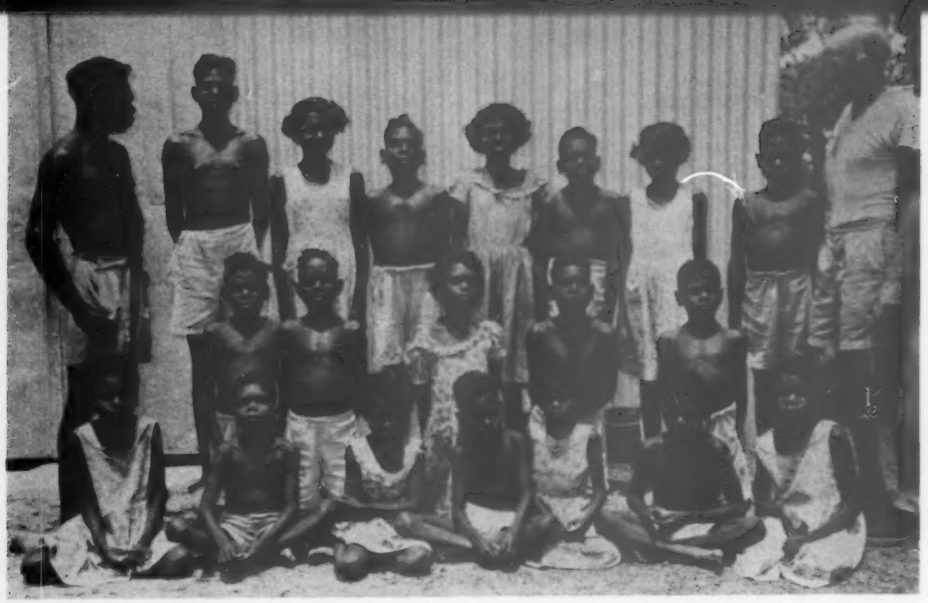
Why should there be at this time a great international effort in archaeological rescue work in a desolate desert region of Africa? It is obvious that the United Nations, through its division of UNESCO, has created an organized international conscience where matters of culture and civilization are at issue. But I think that even without the official organization of UNESCO many nations would make an effort, as they did many years ago when the Aswan dam was built, believing that the history and culture of Egypt is a heritage of the whole civilized world.

In hearings before the Senate Foreign Relations Committee, we were asked why, if the Russians were financing a dam for the Egyptians, those two nations should not also take the responsibility for rescuing historical remains. We replied that Western civilization began in Egypt and the Near East and that it is our heritage as well as that of the Egyptians and the Russians. Perhaps we should have added that the Western Europeans and the Americans, more than other people, have been able to reconstruct much of the history of civilized living from their studies in Egypt; there is much that we do not know and very much yet to be learned; and it is Western diggers who are still the most able to reconstruct history on a world-wide scale. The Egyptians and the Russians are certainly doing their part in the salvage program, but it will take the combined efforts of many nations if the remaining archaeological sites are to be excavated and such great monuments as Abu Simble are to be preserved.

There is another and perhaps even more important aspect to the UNESCO plan for Nubia. In their desire to save everything possible before the inundation, both the Governments of the Sudan and of Egypt have offered to compensate all institutions and governments for their work in Nubia with art objects excavated or now in the museums of those countries, and to permit large-scale excavations in Lower Egypt with foreign nations sharing the art objects unearthed. Archaeology in Egypt has been in the doldrums for many years because of the rather inhospitable policy of the Egyptian Government. Many of us believe that the new Egyptian Government has now reached the kind of intellectual sophistication which recognizes the need for international archaeological research in Egypt. The Nubian program is quite probably the first step toward a new era of research in the Nile Valley, both in the Sudan and in Egypt. Egyptology, which was once almost synonymous with archaeology, may well be re-born with greater vitality than ever before. Those of us who are diggers know that many surprises remain in the earth of the Nile Valley and that the history of the world's most durable ancient civilization is still to be written.

Next January, Prof. W. Kelly Simpson of Yale University will return to Nubia in charge of the combined University Museum-Peabody Museum expedition to begin excavations at one of the sites between Aswan and the Sudan border. He will be expending funds left to the University Museum by Eckley Brinton Coxe, Jr., the man who also gave the Museum its entire Egyptian wing, and he will be continuing the tradition of Museum research in Egypt established by Eckley Coxe at the beginning of the century. In our recent survey of Upper Egypt, cruising up the vast reservoir between the first and second cataracts already created by the Aswan dam, or walking across the desert in the blazing sun of May in Nubia, we often thought of our earlier expeditions there. At Buhen, Anibeh, Areika, and Karanog, from which we now have large collections, expeditions were led by Leonard Woolley, D. Randall-MacIver, F. Ll. Griffith, and Geoffrey Mileham. We would very much like to know what they would do in 1961.

In Egypt we met the new generation of British, French, German, and Italian diggers who were also thinking of their predecessors—several generations of them in the century and a half since Napoleon included archaeologists with his Army of the Nile—and like them, we were reminded that there is one great difference between this and earlier campaigns in Egypt. Today, independent Egyptian and Sudanese Governments have organized, through the United Nations, an international enterprise in archaeology which has no precedent. A recent International Geophysical Year successfully cut across national conflicts and rivalries to demonstrate that scientists and scholars can rise above the political conflicts of our generation. All of us hope and believe that this current campaign in Nubia will reinforce the new principle of international scientific and cultural cooperation—a principle which should have an important influence upon our future.



# *Sketches of Tiwi Children*

By JANE C. GOODALE

***Readers of Miss Goodale's account of Tiwi funeral ceremonies in the Fall 1959 number of* EXPEDITION *will remember that the Tiwi are one of the aboriginal tribes of Australia, and that a group of approximately 180 of them are living at the Australian Government Settlement at Snake Bay on Melville Island, where they are learning to accept some Western ways while still retaining much of their Stone Age culture.***

***Miss Goodale lived among them from April to December 1954 and these sketches are based on happenings during those months. She has referred to her Tiwi friends by their English names because those are the names she always used in talking with them, but it should be remembered that while all of the children and some of the adults have been given English names by their white friends, every Tiwi is ritually given up to eighteen unique native names throughout his or her lifetime. While every native name must be unique, most of the English names are not, and thus distinctions are made in various ways. In the story, Dennis is a girl originally named Denise but never called that. Young Jenny is the youngest of five women of the same name—Long Jeanie, Jennie Green, Hoarse Jenny, Jeanie One and Two. And finally, as many native names are descriptive, so are a few of the English—one of these is Happy.***

# *Dennis and Crissy-Boy*

It is already a warm day and the air has a heavy content of moisture for the rainy season is not yet over even though it is mid-April. Fat Alice and her companions walk slowly through the bush, their naked feet treading carefully on the burned-over ground, their eyes constantly alert for the slithery movement of a poisonous snake. Dennis walks beside Fat Alice, her father's sister. Behind them follow Margaret, Dennis' mother, and her father's second wife Filicy, with her small son Crissy-Boy sitting on her shoulders, babbling cheerfully in neither Tiwi nor English but in his own childish language.

Each of the women carries a yam stick over her shoulder and a piece of calico or flour bag in one hand. Two of them have soot-blackened billy cans with their wire handles slung over the yam sticks, and as they walk, their movement causes some of the water in the cans to slosh out on the ground.

"We stop here," announces Alice and places her billy can under the shade of a small macrazamia tree; and the other women put down their burdens and, in a quick movement, readjust their calico skirts by rewrapping the strip of cloth around their waists. Crissy-Boy, having no clothes, goes skipping around but Dennis as a four-year old carefully imitates her elders and stretches her calico wide between her outstretched arms, then folds it over and tucks in the loose corner over her little hips.

A fire is made and the billy put on to boil for a cup of tea and the three women quickly dig up some small yams and put them in the fire to roast. Dennis and Crissy-Boy hover about the fire and as soon as a yam is cooked they receive it in their little outstretched hands and hungrily gobble the tasty morsel. The women content themselves with tea and shortly return to the main task of digging the yams.

Revived by their repast, the two children invent a game. Closing their eyes, they run about the small area with their arms raised high until one of them with squeals of surprise tumbles into one of the yam holes. Climbing out, they start again, their shrill voices growing louder as the game goes on. The women continue their work without a glance at the two youngsters.

Eventually tiring of this sport, Dennis begins gathering twigs and builds a small fire-pile in a clear spot on the ground. Imitating her, Crissy-Boy contributes two small twigs, then watches as Dennis carefully picks up a burning stick from

the yam fire and carries it to her pile, laying it carefully on top of the twigs. Both children now lie flat on their stomachs and from opposite sides blow and blow upon their fire until they lie back coughing for breath, the immediate result of their efforts being an anaemic wisp of smoke struggling upwards. Recovering rapidly, the two children dart about gathering more sticks to place on the smoking pile in an attempt to coax a flame or two, but only succeed in extinguishing what life there was.

Now they are tired and their mothers have gathered many yams and call them to the shade and take them into their laps. Each child munches on a yam, and Crissy-Boy is given his mother's breast to nurse for a few minutes until his eyes close and he is asleep. Dennis is not far behind and soon only the soft voices of the women break the warm hum of the afternoon.

## *Playing Grown-Up*

On the hill near his brush shade where he and his wife had lived until her death a few weeks ago, Jimmy waited for his deceased wife's relatives to gather before he could begin the evening's *ilanea* in her honor. It was a long wait for the goat herders had not yet arrived and these two women would be extremely angry if the dancing began without them. One of them in particular was already angry with the widower Jimmy because he had defied custom by usurping the leadership role in the funeral which rightfully belonged to his wife's paternal kinsmen, of whom the goat herder was one.

Jimmy was growing angry too, for all was not proceeding as he ordered and murmured criticism from assembled groups was reaching his ears. But before the tension reached a breaking point, the children took over.

Down on the field below the hill, a small group of young boys and girls sat in a circle chatting. Then from behind a clump of bushes another boy appeared and stood quietly. He was joined by an emissary from the "home" group who whispered a name in his ear. The visiting boy returned to the bushes but soon emerged followed by his mob of boys and girls and all of them rushed to the "home" group, and flinging their arms about an opposing child, they wailed and sobbed in the most heartrending manner—for a minute or two. Then breaking away, the groups changed places, the grief changing abruptly to joy and laughter as they reformed, the "home" group inventing a death in their company to whisper to the "visiting" group when they should appear from the bushes, wailing and sobbing when the news was delivered.

The parents and relatives on the hill were amused and entertained by their children's performance and speculated among themselves as to who might have been chosen for death each time the game began.

After a number of these preliminary rounds, one ten-year-old boy began to clap his hands together and the gang all gathered in a circle, the boys slapping their hands against their thighs in a fast beat. One little boy, not yet six, stamped into the center of the circle with his arms held straight above his head and danced his version of his father's difficult shark dance, while the girls danced as a shuffling chorus on one side of the circle. Two brothers took over from the small boy and this time they were joined by their young sister and all three circled the ring, stamping the ground in time to the beat.

The children were quite serious now and the only signs of amusement came from their adult audience, who were careful to keep their comments low so they would not be overheard by the children. The "play *ilanea*" was soon broken up by the lead goat who wandered into their midst; and the shrill cries of the two goat women urging their reluctant charges homeward were the signal for the adults to take over and begin the serious work of the evening dance.

# *The Pandanus War*

In the dusk of the evening, Stewart practiced his aim. He held a long pandanus frond in his hand and carefully crept up to the fire where his sister Blanchy played with a baby wallaby. His sister did not hear him approach and continued to set her newly orphaned pet some distance from her and try to coax it to come back hopping to her lap. But Stewart had a different plan and stood very quietly behind Blanchy. When the little wallaby turned to hop back, the pandanus spear was set quivering and then thrown at point blank range at its small quarry. The flexible missile flopped harmlessly to one side of the little animal who, in one leap, reached safety in the little girl's arms. Blanchy rose to defend her new playmate and told her older brother in no uncertain terms to go find some other game and leave "joey" alone.

Stewart was a nice little ten-year-old and he also knew his sister would give him no further chances for a sneak attack, so he picked up his "spear" and continued his practice with a dead stump for a target. But Stewart was foolhardy and did not keep an eye on his mischievous six-year-old sister. Quietly Blanchy rose and gave her pet to one of the women to keep and took her older sister's little two-year-old daughter Patricia by the hand, and together they disappeared into the bush. They armed themselves with several pandanus frond spears and then, ever so carefully, they prepared their revenge attack. Approaching Stewart from opposite sides, they took up their positions unnoticed only a yard away from their enemy. Blanchy gave the signal, an ear splitting shriek, and they sent their spears wabbling through the air toward their mark. Completely surprised, Stewart froze momentarily, then ran toward a pandanus bush and gathered his ammunition, and the battle began.

The odds were about even to begin with, for little Patricia added little but vocal and moral support, and although Blanchy's aim was not as good as her brother's, she made up for it by being quicker on her feet, and easily dodged his spears. But Stewart was bigger and stronger, and faster at gathering and throwing the pandanus spears, and soon it was apparent that he had the upper hand. At this point, Patrick, Patricia's father and Blanchy's husband-to-be, entered the war on the side of his women-folk. Stewart, far from thinking this rather unfair, viewed Patrick as a worthy opponent and a great challenge; and the fighting continued with pandanus flying through the air almost continuously. The two little girls relinquished their aggressive role and became spear retrievers, scuttling underneath the barrage to gather the fallen ammunition and indiscriminately rearming both opponents.

Fortunately for Stewart, darkness enforced an indecisive peace and the young warriors returned to their camp fires quite ready to retire for the night, exhausted but happy. Blanchy curled up on the ground beside her brother and made a nest for the little wallaby in her arms. Before falling asleep, they sang a new school song, to the tune of the Volga Boatmen:

Row, boys, row. Row, boys, row.
Bend your shoulders; row, boys, row.
Row, boys, row. Row, boys, row.
Bend your shoulders; row, boys, row.
Though the tide is free and fast,
We shall reach our goal at last.
The day is ending; soon night will fall.
Toil and labor, one and all.

# *Happy Hunting*

As I lie on my soft mattress of paperbark, snug under my mosquito net from the torments of the night, and warmed by the nearness of a small fire, I look over to the right where my three companions of the past days lie asleep—their forms outlined by the flickering light of four surrounding fires, and wonder about Happy.

Happy was one of my first Island friends. Soon after my arrival at Snake Bay, I had given a group of young boys and girls some lengths of string for it was my intention to record Melville Island string games or "cats' cradles." With hands quicker than the eye, the children formed a variety of figures and then explained what they represented and went on to tell stories concerning the depicted animal or spirit. Soon however, they stopped and one said to me, "If you really want figures and stories, ask Happy for she knows more than any one of us." Soon I met Happy, a tall girl with a constant wide smile and merry eyes. As her slender body showed no signs of budding womanhood, I estimated her to be about eleven years old.

About a month after this, we decided to obtain some examples of the old-style water containers made from the leaf sheaths of the tall cabbage palm known locally as *tulini*. The nearest stand of these trees was up near the headwaters of the Tjiperapu River, a two-day journey. Happy's parents, Laury and Nora, were asked to make this journey and to take me along. The first night we camped on the opposite shore of Snake Bay, for we had made too late a start to gain any distance up the mangrove-lined river where camping spots are rare. Laury and Nora were shy with me for I had, up to this time, spoken no more than greetings to them, but with Happy there was no strangeness and she took it upon herself to watch over and entertain me.

That first night after completing our simple meal, Happy and I went down to the water and sat on the beach, and she started to tell me about other trips she had made about the Island. With a stick she drew a map of the entire coastline of Melville Island and then began naming the points of land, the rivers and creeks, and the camping places, as she travelled with her finger over the hundreds of miles of shoreline circumnavigating the large island which was her home. Nora silently joined us and once or twice gave a forgotten name or corrected her daughter, but mistakes were few and the recital took close to an hour, for there were remembered events connected with many of the names.

Early the following morning, we set off in the large dugout canoe. Laury and Nora paddled steadily upriver while, from time to time, Happy dipped her own child-sized ironwood paddle into

the water contributing her small power to the whole. At midday, we made landing on a small rocky beach and, without a word, Happy took the axe and began cutting into the tangled roots of the surrounding mangrove, pulling out the slimy mangrove worms and slipping them down her throat, while Nora built the fire and set the

billy to boil, and I laid out the lunch of cheese and corned beef, of which we all partook as soon as the thick black tea was hot.

All afternoon we made our way up the quiet river, the banks closing in rapidly as we neared the end, and the light becoming tinged with green as the mangrove trees growing on each bank joined their branches overhead, making a complete archway. Colorful parakeets flitted through the leaves, catching occasional rays of sunlight and thereby gaining brilliance.

Rounding a bend, we made for the landing—a steep dry bank void of any mangroves. This landing had a name, Danuru, meaning "dry landing" for it was the only good landing for miles of river. There was also a camp—a collection of old bark lean-tos resting crookedly on sapling supports. Our belongings unloaded and the canoe secured with a large rock anchor, Happy was given our several billy cans and sent to collect fresh water from a neighboring billabong, while her father, with the axe over one shoulder, disappeared into the bush behind the camp in search of supper. The water chore completed, my young friend set to work on the lean-tos, taking a strip of bark from this one, a support from that one, and working industriously, singing all the while a medley of Tiwi love songs and "The old gray mare, he ain't what he usta be."

Finally she sat down beside me and pronounced her "shade" finished. "You sleep there tonight?" I inquired. "Oh no. That just for fun. I sleep outside."

As the light began to fade, the evening chores began. There was firewood to collect—slow-burning wood for the night sleeping fires, and fast-burning wood for the cook fire. Again, Happy was sent out to collect both varieties and soon returned with all she could carry, which was quite enough for our purposes. The cooking fire was started by Nora and soon Laury appeared with two 'possums, already gutted, which he handed to his wife, following the custom that "he who catches must not cook" (the first law of food distribution—for the cook gets a certain portion, the hunter another, while the rest is shared by companions). The 'possums were soon cooked and with some additions from our dull selection of canned food and the inevitable tea, we dined. While there was still some light, Laury took the axe to the billabong and cut a large supply of supple paperbark for our beds, while Nora chased the snakes away from our camp by setting the surrounding bush on fire with

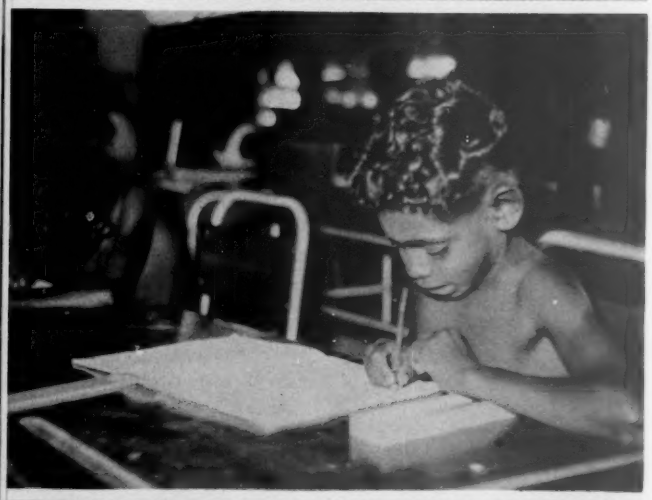
a burning stick. The flames roared upwards and sped through the dry grass and dead fronds of pandanus, but soon the evening dew would fall and extinguish the flames;—the snakes presumably would not venture back over the burned ground till daylight.

Early the next morning we set out for the inland stand of tulini palms, hunting and burning the grass as we moved through the bush. Only two stops were made, one for a 'possum and one for a nest of wild honey, but Laury marked in his mind likely 'possum trees to be looked into on the journey back. After a few hours, we reached the open grassy area with the tall tulini palms standing majestically silhouetted against the deep blue sky. While Laury and Nora (and I) had a smoke, Happy chopped down a young tulini and cut open the very top of the trunk to reach the heart where the fibers were crisp and tender. It did not take the four of us long to finish this delicacy. Nora chopped the next one down, a larger, full grown tree, and this completed our lunch. We gathered half a dozen of the dry leaf-sheaths and began our journey back.

We were now hunting in earnest. Our progress was slower than usual because Happy was often instructed to climb a tree suspected of harboring a 'possum; to test this, she inserted a stick into the hole and twisted it to pick up hairs from the quarry's coat. If the test was successful, Laury took over and chopped or smoked the animal out of its home. It was almost dark when we returned to Danuru with two additional 'possums. Again Happy was sent for water and firewood, and Nora prepared our supper while Laury attempted to patch some of the more obvious tears in the calico-and-flour-bag sail, for with the prevailing wind and current behind us, we would sail down the Tjiperapu to Snake Bay in the morning.

Why am I wondering about Happy as I now lie awake at Danuru? From previous companionship with this eleven-year-old, I had grown to appreciate her knowledge of Tiwi legend which far surpassed that of the other children her age. On this trip I had observed the extent of her knowledge of the country, not only that portion with which she is personally familiar but her awareness of the entire Island, its size and shape, its names and much of its history. And in a more important aspect she had shown me that she knew the products of the country and how to obtain and utilize them to their best advantage. This in itself was not surprising, for had not Western influences come to her country, she would now be a married woman, expected to participate in the daily economic affairs of her husband's household, and it was the duty of her parents to educate her in these and other aspects of Tiwi culture until she reached approximately eight or ten years of age. Happy's parents had not given her to her promised husband a few years back when they should have. In this respect they had yielded to Western influence; but they had not stinted on her primary bush education. Tomorrow, however, Happy's life would take a momentous turn. The supply ship from Darwin had been expected the day we left Snake Bay. On this ship, in addition to the usual cargo, were to be books, desks, chairs, and blackboards to fill the new and shiny but empty schoolhouse, and most important of all, on this boat would be the "Teacher," an unknown element to be added to the small Settlement society.

I lie here thinking—trying to visualize the impact of this one man and his books on the future of Happy and her generation—I fall asleep.



## *Young Jenny*

By any standards, Jenny was a beautiful young girl. Her slightly wavy, light brown hair with its red highlights framed the smooth-complexioned brown face in which were set twinkling black eyes, well-formed nose, merry mouth which almost never closed to hide her brilliantly white and even teeth. Her body was firm and well shaped, her hands delicate with long, tapering fingers and nails short and clean. Wearing only a *naga,* she had the appearance of a carefully groomed young lady. Her speech was quiet and modulated and her pleasant personality gained her many friends and often won her the leadership in activities undertaken with her contemporaries.

But of all her age group, Jenny had the most immediate and personal problems, for in 1954 she was caught right in the middle of the old and the new way of life. Jenny grew up in a household dominated by her mother, the second of four children. First came Margaret, now in her late 'teens, then Jenny herself just entering her 'teens, and Stewart about ten, and last, Blanchy aged six. Their mother, in her thirties, was a firm disciplinarian and adhered strictly to the traditional ways of life. She not only insisted that her family conform to the time-tested customs, but was also consistently vocal in her criticism of others in the Settlement who strayed from the past ways. Many years ago, when she herself became a *muringaletta* upon reaching puberty, her own father had promised that her first female child would belong to a young man, Patrick, when she should reach the age of eight or ten. And so in due time, Margaret had been born and reared and given to Patrick, then in his thirties, as first wife. Jenny too had been promised to Patrick before she was born and she, in time, joined her older sister as second wife to a man almost thirty years her senior.

Very soon Jenny would reach puberty, and it had been planned to take her then into the bush for five days where she would stay with her parents and siblings, including Margaret, her co-wife. There her father would take a long wooden spear carved with many barbs on two sides and place it between his daughter's legs, then give it to a man in the Settlement as a promise that Jenny's first-born daughter would be given to him in exchange for the spear if he fulfilled his obligations to Jenny properly as a son-in-law should from this time on.

But other plans had also been made, plans which might well change this course of events for Jenny and her future daughters. She had been married to a man who was not so unbending to the changing times as his parents-in-law. Patrick quite willingly acquiesced to government authority and sent his school-aged wife to school as soon as it began at the Settlement. Here, in the company of her generation, she passed the day in the happy discovery of new words to be read and written, songs to sing in part harmony, new games to play, and new manners to practice with one's schoolmates. She owned her own school dress, her own pencil and notebook in which she recorded the events of the day gone by, illustrated in her own fashion. At recess she played soccer with the others or vented her energies with a skip-rope. She ate her lunch with the other children with a knife and fork, sitting at a long table.

However, with the close of the school day, when the other children took off to go swimming, or to wander through the bush in search of food and adventure, Jenny was torn between her desires and her duty. It was her duty to return to her husband's camp and help her sister who was pregnant by taking care of that bundle of two-year-old energy that was Patricia, Margaret's first-born. She had also to draw water and gather firewood before it grew dark. Patrick recognized his younger wife's problems, but he also had his duty to train her to be a good wife and mother. More often than not, he would look the other way when Jenny delayed her return for several hours after school, but Jenny learned that there was a limit to his indulgence if she delayed too often or too long.

Patrick wished to maintain his authority over Jenny for reasons she did not quite understand. If Patrick had given up his young wife fully, she would have returned to her parents' household, and he did not trust his mother-in-law to help and direct her through this critical period of change from the old pattern of life to the new. Patrick's plans for Jenny included as much schooling as possible and then a new marriage to a person of her own choice, a form of marriage which her mother did not approve for it lessened the obligations of the son-in-law to her and reduced her sphere of influence. But Patrick was Jenny's husband and as such had first say in her future and could thus overrule her mother. And so he would not free Jenny, who would remain the youngest wife in the Settlement and the only actually married girl in the school until such time as she would fall in love, when she would gain her freedom from the old ways.

*Jahangir's Quadrangle as restored by the Department of Archaeology of Pakistan*

# The "Old Fort" at Lahore

## *Restoration of a Moghul Fortress in West Pakistan*

*By* GEORGE F. DALES, JR.

"On Monday, the 9th of the Divine month of Āẓār . . . [Nov. 20, A.D. 1620], mounting an elephant of the name of Indra, I went towards the city, scattering coins as I proceeded. After three watches and two *gharis* of day had passed, at the selected auspicious hour, having entered the royal residence, I alighted happily and auspiciously at the building recently brought to completion and finished handsomely by the exertions of Ma'mūr Khan [the 'Lord Architect']. Without exaggeration, charming residences and soul-stirring sitting places had been erected in great beauty and delicacy, adorned and embellished with paintings by rare artists. Pleasant green gardens with all kinds of flowers and sweet-scented herbs deceived the sight."

So wrote Jahangir, fifth of the Moghul emperors of India, after his first visit to his newly constructed Quadrangle in the palace-fort at Lahore in 1620. Today, this "Old Fort" comprises the major group of secular buildings in Lahore, among some of the richest and most nearly complete examples of Moghul architecture in Pakistan.

*Jahangir's Quadrangle before restoration in 1923*

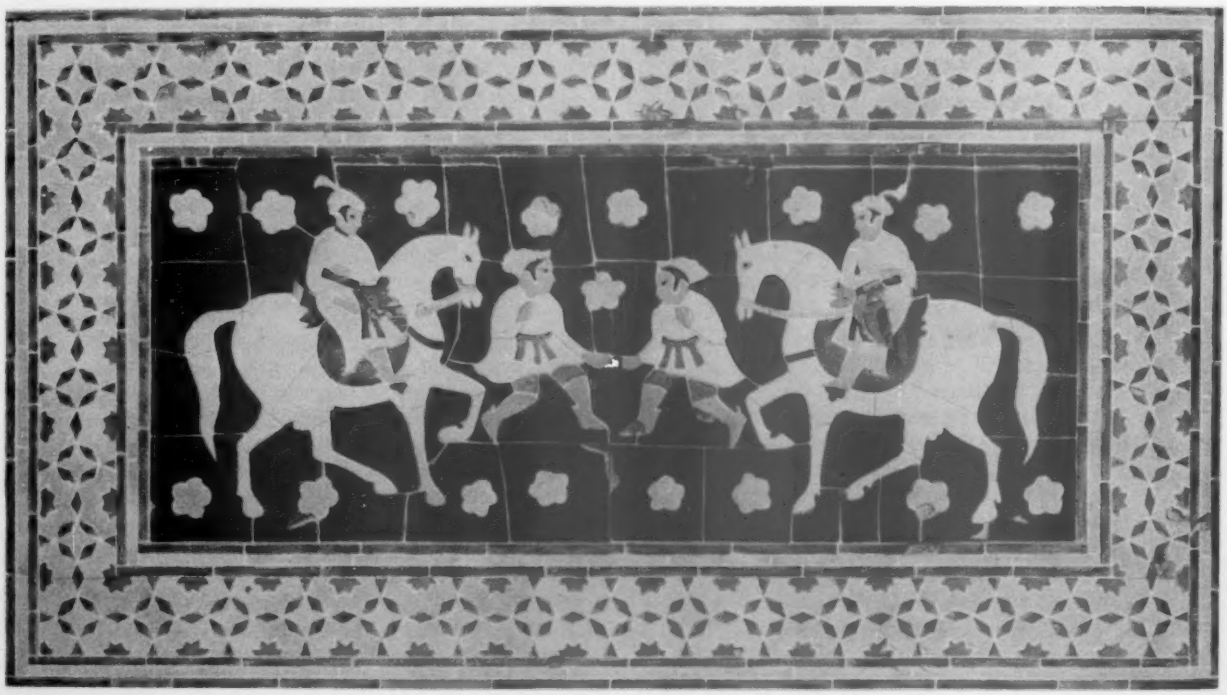
The Moghul empire was founded by Babur (A.D. 1483-1530), a descendant of the Timurids and Jenghis Khan. After successfully invading northern India by way of the Khyber Pass, Babur established his capital at Delhi. Lahore was selected as one of several provincial capitals because of its militarily strategic position and because it was one of the most important commercial and trading centers in northern India.

The earliest history of Lahore itself remains buried beneath the present living city. Archaeologically, its history begins with the fortified palace and city walls of the fourth Moghul emperor, Akbar (A.D. 1556-1605). Akbar's son, Jahangir (A.D. 1605-1627) was responsible for the building of the magnificent quadrangle that he so vividly describes in his Memoirs. Important additions were made to the fortress complex by Jahangir's son and successor, Shah Jahan (better known perhaps as the builder of the Taj Mahal at Agra), and by the emperor Aurangzeb in A.D. 1673.

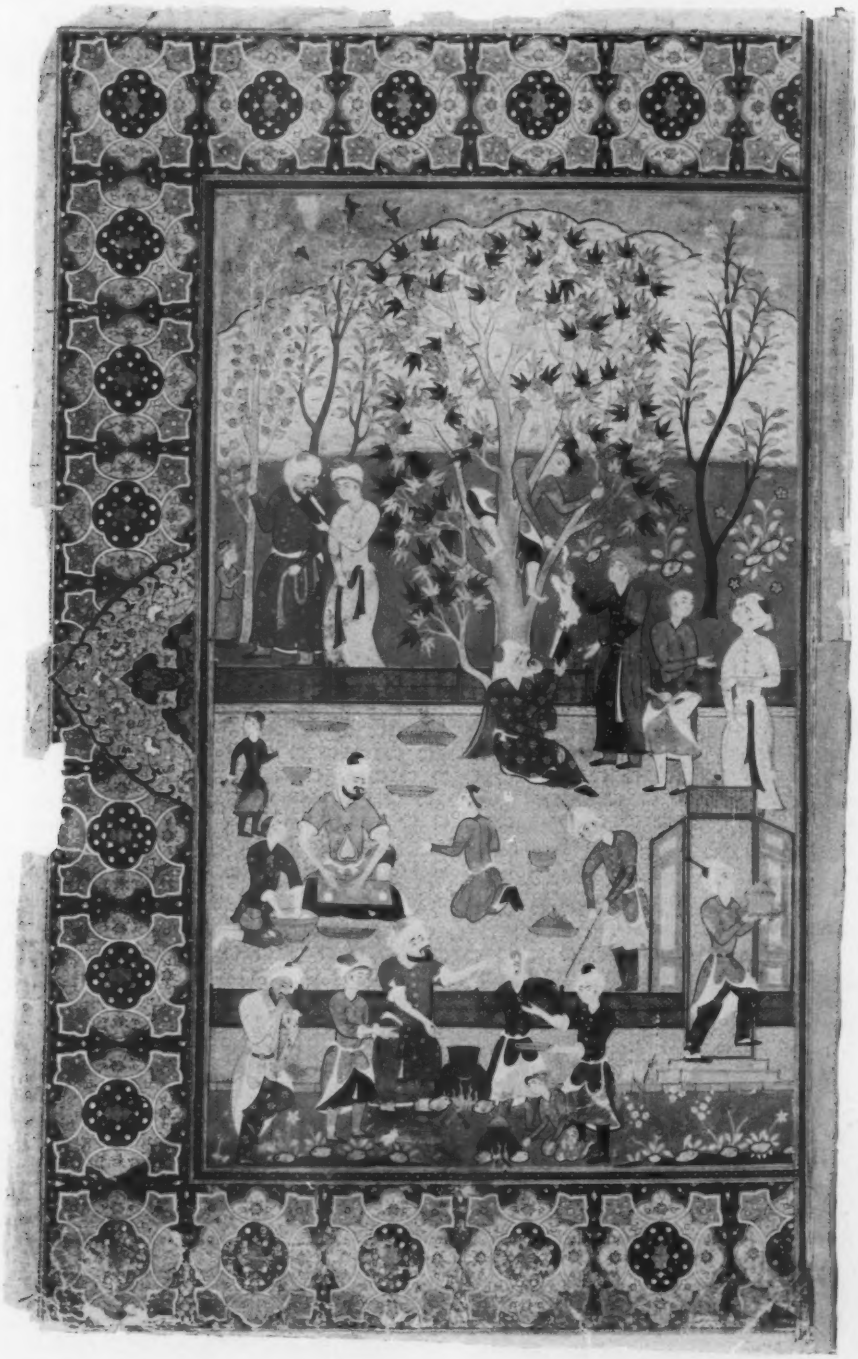
After the death of Aurangzeb in 1707, there followed a long period of neglect and destruction as the Moghul power gradually waned. The splendor of sovereignty was revived for a short time within the ancient walls of Lahore when the powerful young Sikh leader, Ranjit Singh, the "Lion of Lahore," made it his capital in 1799. His death in 1839 was followed only ten years later by the British annexation of the Punjab. The fort then served as a garrison for British troops until 1923, when it was abandoned.

Moghul architecture, so richly and completely represented in Lahore, displays a curious combination of elements, styles, and craftsmanship. It presents a material manifestation of the religious and cultural tolerance of the early Moghul emperors. By the time of Akbar, the wedding of Islamic architecture familiar to the Moghuls with Hindu architecture and iconography was complete. The profusely sculptured red sandstone buildings of Akbar and Jahangir are distinguished by features of Hindu architecture that would have been more appropriate in wood. Such Hindu decorative elements as animal and human forms that were normally forbidden in the Islamic repertory were carved into the stone.

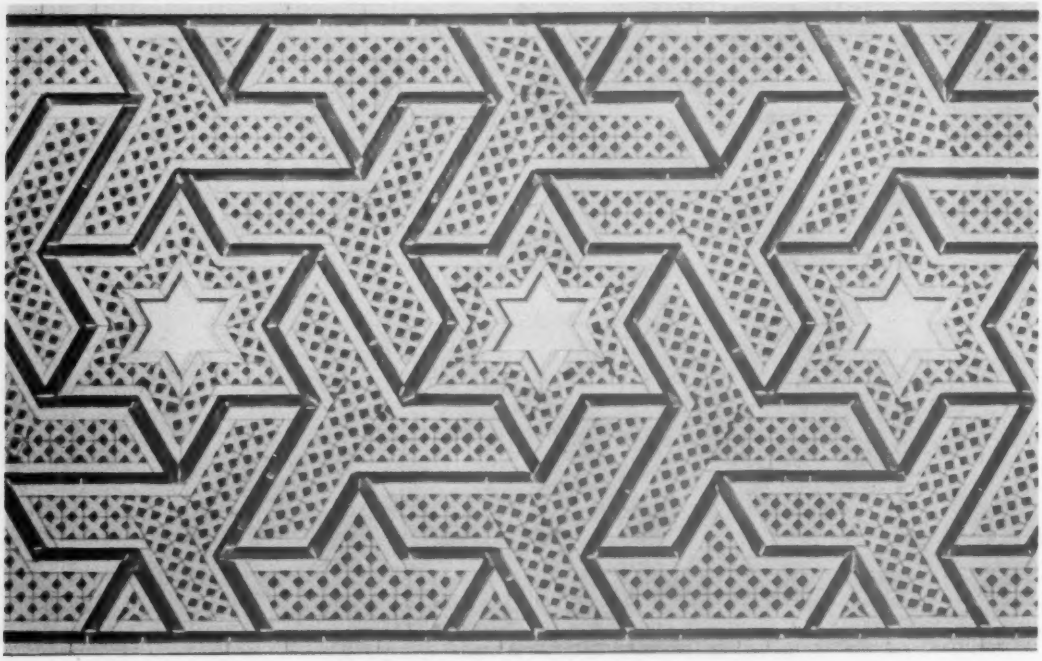
*Mosaic tile from the fort. Court games which featured combat between various animals were popular in the 17th century. Horsemen armed with iron or bamboo lances prodded the animals to fight more fiercely.*



*Mosaic tile showing horsemen and wrestlers participating in court games*



*Persian court life greatly influenced the Moghul courts. This late 16th century miniature painting shows a typical party in a Persian garden.*



*Decorative tile border under cornice*

Especially interesting are the shape and position of the brackets under the eaves, the inclined struts supporting the roof beams, and the pillars which are all of stone but obviously derived from wooden prototypes. Shah Jahan's architects introduced the use of white marble inlaid with floral designs of agate, carnelian, and lapis lazuli. Still another striking feature of the Lahore fortress is the unique decoration of panels of colorful tile mosaics preserved on part of the north and west walls. One hundred and sixteen panels of these mosaic decorations cover a wall five hundred yards long. The manufacturing technique was introduced from Persia but many of the scenes portray Indian motifs. There are scenes of court life, sports, elephant fights, polo games, dragons, and camels as well as the more usual geometric and foliated designs. The identification of the emperor responsible for these magnificent mosaics is uncertain, but the portrayal of living beings —both human and animal—reflects the unorthodox, religiously tolerant tendencies of both Akbar and Jahangir. Jahangir especially had a great fondness for pictures and took pride in his court painters, in defiance of the basic tenets of the Moslem creed.

In 1923, with the abandonment of the Fortress by the British garrison, the Archaeological Service of India began the work of restoring, repairing, and preserving what remained of the ancient structures. Since the Partition of Pakistan and India in 1947, the Pakistan Department of Archaeology has continued the work on the Lahore Fort. Lost wall foundations are being recovered, fountains and waterways are being restored, plastered wall surfaces are being removed to reveal the underlying frescoes, damaged sections of filigree stone work and tiling are being repaired.

The Fortress thus is being restored to something of its former physical grandeur. In the Quadrangle, the dusty drill field of the British garrison has now been returned to Jahangir's glistening pool and beautiful gardens; the heavy, regimented steps of army officers and men have been replaced by the light-footed, carefree steps of small deer and colorful birds; the ranks of shining upright rifle barrels have given way to regular rows of fountains, shooting their cool sprays up into the jasmine-scented air. The modern visitor can appreciate Jahangir's delight upon seeing his newly constructed Quadrangle and can say with him:

"From head to foot how sweet, turn where I please. Soft glances at my heart cry, Take thy ease."

# Electronics and Archaeology

*By* MATTHEW W. STIRLING
FROELICH RAINEY
MATTHEW W. STIRLING, JR.

For centuries men have dreamed of a "divining rod" or device that would indicate the presence of buried treasure in the earth much as the X-ray reveals the presence of bones or foreign objects concealed in a living organism. Archaeologists have not been immune to this thought, but their interests are broader than the mere finding of treasure.

It is only recently, however, that this dream has emerged from the field of wishful thinking and that something is actually being done about it. The reason for this delay is that some big project, such as a war, where money is not a consideration, is necessary to bring about the sort of basic research required for the development of such tools.

The first practical attempt at such an application developed from the mine detector of World War II. As usual, the first civil use of metal detectors resulted from economic needs when commercial concerns made use of the principle to locate buried pipe lines and the like. It was not long before someone got the idea of using metal detectors in archaeology, but it must be admitted that treasure hunters rather than scientists were the most active in this regard. Fortunately perhaps for the preservation of archaeological sites, this device responds better to iron than gold and did not prove very successful. Thus far, archaeologists have made little use of it because of its limited application.

Important contributions to archaeology have come out of atomic research. The radiocarbon method of dating prehistoric remains may prove to be the most significant contribution to archaeology during the past generation.

Urey's discovery that the ratio between the several isotopes of oxygen in the ancient skeletons of aquatic animals is directly proportional to the temperature of the water at the time these creatures were living, has given an accurate means of measuring temperature fluctuations in the sea over a period of one hundred million years. This and other techniques for prehistoric dating derived from atomic technology, such as the potassium-argon method and the thermoluminescence technique, may eventually make it possible to determine exact ages throughout the whole period of the Ice Age and to date more precisely pottery of the Neolithic Age. There is every reason to believe that the rapidly developing technology resulting from atomic research will provide other and still more revolutionary tools for archaeological research.

Most of us are beginning to realize that instruments resulting from electronic research may be just as important to the archaeology of the future. The two electronic devices now in use for underground exploration are the proton magnetometer and earth resistivity apparatus.

The proton magnetometer is a detector of very small changes in magnetic strength. It can detect not only buried iron deposits with obvious magnetism, but also buried kilns and soil disturbances. The kilns are detectable because the heating of the clay in past times has caused the

*Recording the readings on the resistivity meter*

small quantities of particles of inherent iron oxide to be aligned in one direction rather than at random, the resultant magnetism being larger than that of the surrounding earth. Some types of soil disturbances, especially ones associated with human occupations, are detectable because of the difference in the magnetic susceptibility of topsoil and sub-strata.

Other possibilities seem to exist with earth resistivity equipment. Electrical methods of exploring beneath the surface of the ground have been utilized for many years in geophysical prospecting for oil and minerals; also, more recently, by highway engineers to determine subsoil conditions prior to highway construction.

However, experimentation with these methods in archaeology has been rare. Dr. Paul Fejos of the Wenner-Gren Foundation recognized the possibilities of this technique in archaeology several years ago, but to the best of our knowledge only British and Italian archaeologists have seriously attempted to make a practical adaptation in archaeological excavation.

In Italy, Mr. C. M. Lerici has used electronic apparatus to obtain the precise location of Etruscan tombs. In England, for several years, archaeologists have adapted and improved resistivity equipment to the point where we can now be sure that electronic apparatus for underground explorations will become a standard tool of archaeology.

The University Museum, which is carrying on major excavations at several different sites around the world, is now beginning a program of research and development in these new atomic and electronic techniques in collaboration with physicists and engineers. However, practical application depends upon considerable experimentation in the field. As a beginning, the Museum acquired two resistivity instruments, one manufactured in England and the other in the United States. Edwin Shook is experimenting with the British instrument at Tikal and the authors of this report have just completed an experiment with the American instrument at the site of Cerro de las Mesas in the state of Veracruz, Mexico; this work was sponsored jointly by the Smithsonian Institution and the University Museum.

Forty miles south of the city of Veracruz, the Bay of Alvarado penetrates deep into the coastal plain. With its source in the snows of Orizaba,

the highest peak between Alaska and South America, the Rio Blanco flows into the bay. The region which it bisects is dotted with a great number of very large groups of earth mounds, marking centers of aboriginal population. Many of these mounds are so large that the present-day natives believe them to be natural hills. Judging from the enormous amount of labor that went into their construction, this region more than a thousand years ago was one of the most densely populated and highly civilized in the New World. Some of these structures were erected by the Olmec around 600 B.C., but the building of mounds reached its climax more than a thousand years later, during what is now called the Tajin period.

In the center of the Rio Blanco area is the site of Cerro de las Mesas, which we believe was the principal ceremonial center for this rich region. Here, more than a dozen large mounds flank a series of more-or-less rectangular courts, one of which was framed by a now buried stucco coated clay wall. Within this Central Square were the major portion of twenty-five elaborately carved stone monuments.

Two of the stelae at Cerro de las Mesas bear dates in the same bar and dot system used by the Ancient Maya. These dates, using the Thompson correlation, are A.D. 466 and A.D. 533. When Dr. Stirling discovered these stones nineteen years ago, two were completely buried and the remainder only partially exposed.

At Cerro de las Mesas we were working under nearly ideal conditions for testing the machine. It is an area of fine sedimentary deposit where the ancient inhabitants had imported large stones for sculptured stelae and other monuments. Any large stones found in the soil are necessarily importations or cultural artifacts. As a result of Dr. Stirling's previous work here, we knew a good deal about the nature of the deposits and the kinds of cultural remains which might be discovered with the resistivity apparatus.

The instrument we used is known as the Michimho, the earth resistivity instrument manufactured by Associated Research Inc. in Chicago primarily for use by highway engineers for determining subsoil conditions prior to road construction. It is a rugged, transportable, twenty-five pound instrument for measuring the electrical conductance of the soil to a depth of thirty meters.

It is connected by four wires to four metal pins driven into the ground at equal intervals along a straight line. An alternating current is passed between the two outer pins and a voltage is thereby induced across the two inner pins giving a measure of the average electrical conductance of the soil between these two pins to a depth equal to the space between them. That is, if the pins are set one meter apart, the average conductance of the soil is measured from the surface to a depth of one meter between the two inner pins.

By changing the pin spacing, the average conductance of the soil can be measured to various depths. This feature permits the interpretation of subsurface layers of soil. For example, if the one-meter reading is subtracted from the two-meter reading, the average conductance of the layer of soil between one and two meters is obtained.

In practice, soil conductance is measured by balancing a galvanometer and reading a dial on the face of the instrument. If there is a difference of soil type, or soil moisture content, a wall, a ditch, or a stone mass between the pins, an anomalous voltage will be recorded.

We were eager to get started with our experiments and went out to the site at our first opportunity. The stone monuments excavated by Stirling years ago had been largely reburied in the soil but most were partially visible. This gave us an ideal situation for a preliminary test. We knew that solid rock has nearly infinite resistance (almost no conductance) and this should register clearly on the machine.

By the time we had cleared the brush away from the monuments and were ready to start taking readings, a crowd of ten or fifteen natives had gathered. When Stirling worked here previously, the people had inquired, "Donde están sus instrumentos?" At that time, Stirling had pointed to the picks and shovels and said, "There they are." Now, nineteen years later, he had returned with an "instrument." The natives stood around quietly as we moved the pins and recorded the figures from the dial. When we tried to explain that we were looking for buried stones they were puzzled. Why would anyone travel from the United States to look for stones? They had a better explanation. There is a treasure buried here and with our equipment we couldn't miss it!

After taking readings both around and away from monuments, we soon learned that the mass of rock buried in the soil between the two central pins gave us a lower conductance reading, as it should, but this difference varied with the pin spacing. For example, one monument 92 cm. in height and 42 cm. in maximum diameter, almost

completely buried in the earth, produced a resistance in the soil 31% greater than the soil adjoining the monument when our pins were spaced one meter apart. When our pins were spaced approximately two meters apart, the difference in conductivity was only 13%. A 20% change in the reading is significant.

Encouraged by the fact that under ideal conditions a mass of rock in the soil would give us a lower conductance reading on the instrument, we set about exploring the unexcavated area in what we termed the "Central Square" at Cerro de las Mesas in the hope of locating unknown monuments by making a series of earth conductance measurements in these unexcavated areas.

Our method was to stake out a field of exploration twenty or thirty meters in width and stretch a meter tape between two of the stakes. We then moved the pins down the line spacing them at one, two, one and two, or one, two, three-meter intervals, depending on the thoroughness we thought necessary. When one line was finished, we moved the tape and read a parallel line one or two meters away, the distance again depending on the completeness of information required.

In this area ("A" on chart), we located five points of high resistance (low conductance) which seemed to indicate buried monuments. Four of the pits were just digging exercise for the workers, as they contained nothing except potsherds. We knew we had something at the fifth point ("A-1") because we struck rock with one of the metal pins while driving it into the ground. This turned out to be a stone monument found by Stirling nineteen years ago and since reburied. Nevertheless, this stone does represent a "hit" in our experiment because the resistance in this section increased by some five points on the dial as compared to the surrounding area. The contrast in conductivity was great enough for us to have excavated there in any case.

After two weeks and many hundreds of measurements, our experiment in locating buried monuments was not really a conclusive proof of the method. We cannot be sure whether there are any additional buried monuments in the area or whether we have missed them in our recordings. We feel quite confident, however, that given a sufficient mass of stone and the optimum spacing of the metal pins, it is certainly possible to locate such artifacts in an area of this kind.

From this point on in our experiment we concentrated our explorations on the earth mounds. Our first trial was on Mound 1. We ran several lines of conductance measurements, cross-sectioning the mound with measurements at depths of one, two, and three meters. When the exploratory trench was dug, we realized at once that our instrument was accurately measuring differences in soil strata. Three different strata of soil were

Conductance × 100

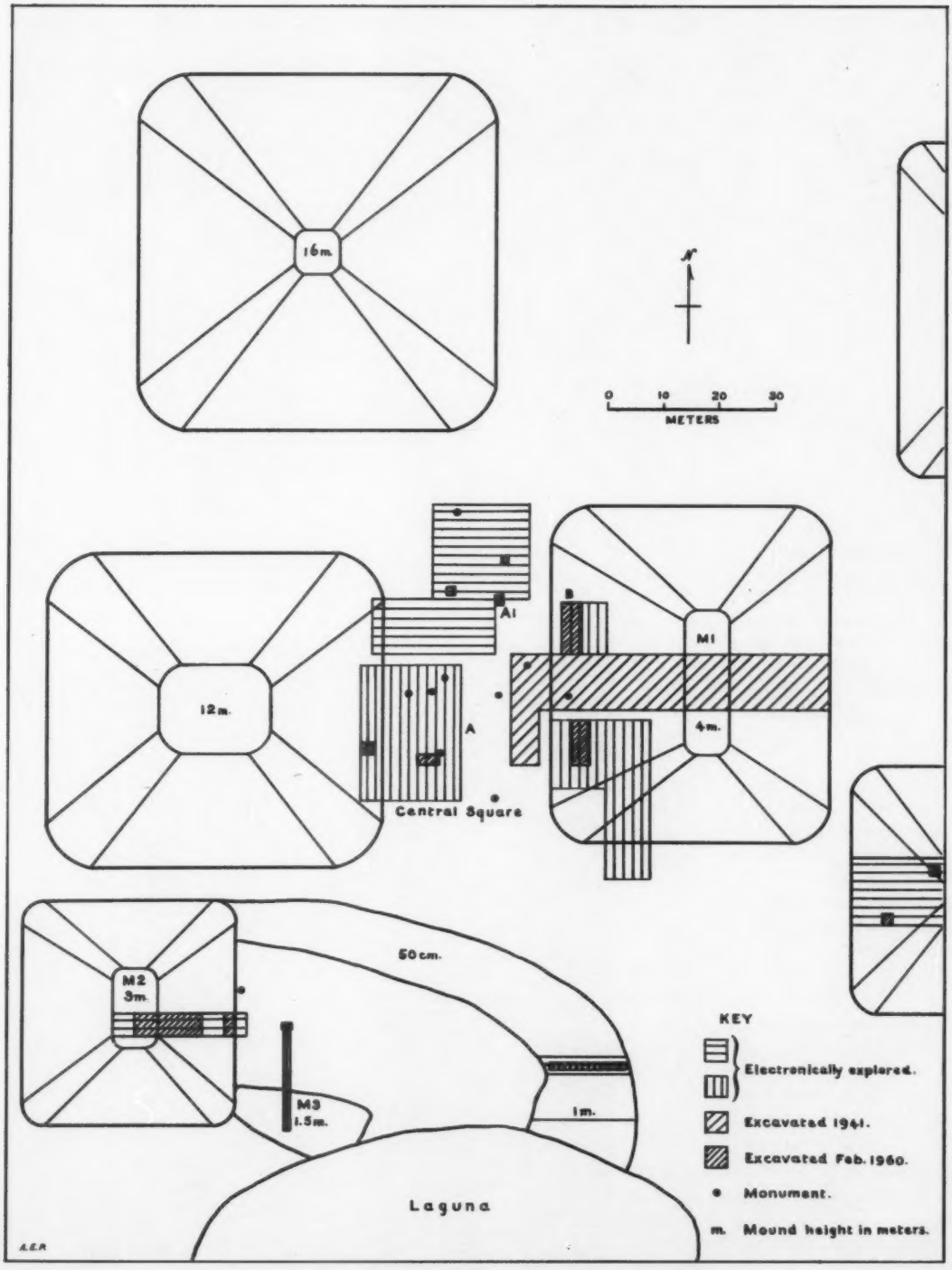
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 m. | 9.9 | 9.0 | 9.4 | 8.9 | 7.9 | 8.0 | 8.0 | 7.6 | 6.5 |
| 1 m. | 14.1 | 17.0 | 14.6 | 10.6 | 13.1 | 14.0 | 17.0 | 14.4 | 9.5 |
| 1 m. | | | 18.0 | 18.5 | 16.4 | 20.0 | 19.0 | 18.2 | 21.5 |

Conductance × 100 = $\left(\frac{1}{R} \times 100\right)$

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10.5 | 11.9 | 10.4 | 11.4 | 10.7 | 11.5 | 11.5 | 13.0 | 11.5 |
| 9.5 | 13.0 | 9.5 | 12.5 | 10.2 | 12.0 | 11.2 | 12.0 | 11.4 |
| 10.8 | 10.1 | 11.8 | 10.7 | 11.7 | 10.9 | 11.7 | 12.0 | 11.3 |
| 10.3 | 11.0 | 11.1 | 10.3 | 10.2 | 11.1 | 10.9 | 11.5 | 11.4 |
| 10.5 | 11.1 | 10.7 | 12.8 | 11.1 | 11.4 | 11.3 | 10.0 | 11.1 |
| 13.5 | Stela 8.4 | 17.5 | 13.0 | 9.8 | 11.6 | 10.8 | 9.8 | 10.4 |

Each box represents 1 sq. m.

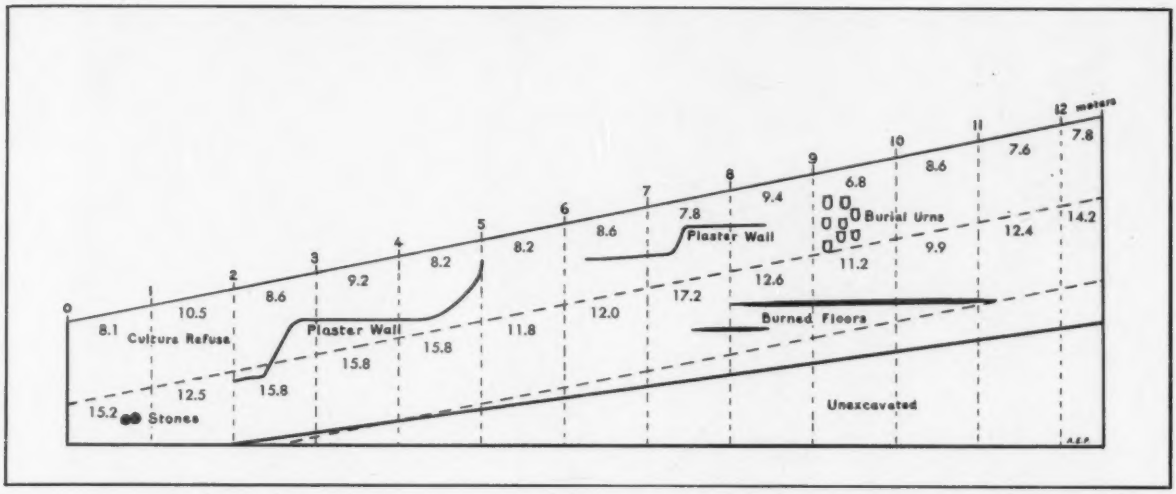
*Conductances for section of area A-1 showing location of stela discovered.*




*Cerro de las Mesas: Central area showing mounds, area explored with apparatus, trenches, and stone monuments*

*Dr. Rainey operating the resistivity equipment in the area in front of the mound; the electrodes are being placed by Roman, our Mexican assistant.*

*Stela 11, excavated by Dr. Stirling in 1941 and since reburied, was located in 1960 by the resistivity meter.*




*Mound 2, section viewed from north. Numbers within diagram are conductance x 100.*

exposed in the mound, an upper level of loose dry soil which has obviously washed down the mound since it was occupied, a middle level filled with potsherds and other cultural refuse, and a third level of dark soil running down below three meters and containing few artifacts.

Our most successful trial occurred in Mound 2. We ran three long lines of conductance measurements from base to crest of the mound, reading each line at depths of one, two, three meters. In making these measurements we noticed a certain regular variation between low and high conductance and jokingly commented that we must have here some sort of terraced structure beneath the surface. That is exactly what we found (see cross section of M-2). A group of fifteen burial urns concentrated in one section less than a meter deep gave us a reading 38% lower than the reading to the left and 26% lower than the reading to the right. This obviously marked an anomaly in the deposit. Lenses of fired earth discovered at the two-meter level also gave us a lower reading.

A small urn containing a collection of jade and other stone figures found in this cut was one meter out of line with our measurements. However, we suspect that because of its small mass it would not have shown in our readings.

As our work progressed and the empty trenches and pits continued to occur, our knowledge of the machine and what we were measuring kept increasing. For example, our first test excavation in the monument plaza produced nothing but a few potsherds. On examining the pit, we noticed that at this point the uniform mantle of light, dry soil was deeper than in other sections. It was clear that our low conductance reading was due to a deeper than normal deposit of the light dry soil.

In reading from base to crest of mounds, we also noticed that the conductance would go down as we went up. This indicates that the soil dries out faster at the top than at the base. Low conductances were also found where the soil was abnormally loose and dry, and around dead tree roots. Therefore, when utilizing this instrument in archaeology, one must always bear in mind that soil moisture content, soil structure, walls, masses of pottery, burned areas, gopher holes, compacted earth, and other subsurface anomalies all affect conductance measurements.

When one is looking for buried objects there is also the problem of their mass related to the volume of soil being measured. An object lying at two meters in depth must have considerable mass to affect the conductance between pins which are set more than two meters apart.

As in all experimental research, there were many times when we were completely puzzled. Why did some of the pits show nothing unusual but still give us large changes in the readings? This enigma can be solved only by extensive field work with widespread digging to show the subsurface conditions for many different readings.

*Pottery vessels from Mound 2*

*Dr. Stirling and Dr. Rainey examining two of the pottery vessels located in Mound 2.*

*Stone axes and figurines with the pottery olla in which they were cached in Mound 2*

We have no doubt that the present instrument can be highly useful in almost any archaeological excavation as an aid in following out archaeological strata or subsurface constructions which have been identified by actual excavation. For example, suppose the digger is excavating a large cave deposit of prehistoric remains in which there is a culture-bearing stratum lying at a certain depth beneath the surface. The extension of such a stratum could be charted and any overburden quickly removed. Or suppose, as in many sites, the excavator wishes to chart the extension of a wall he has located. This could be followed and charted without excavation. The instrument in its present state is no "magic box," but it can certainly be a valuable aid to the archaeologist when excavating a site.

For general exploratory work some sort of mobile apparatus would be highly desirable. The task of driving pins into the soil, taking measurements, and then moving the pins to the next setting is slow and time consuming when one is faced with the problem of exploring a large area. Working as rapidly as possible, we could make at most ninety readings an hour, thus, using one-meter intervals, covering ninety square meters. If a one- and a two-meter reading had been taken at each point, the area covered would have been only forty-five square meters. As a guide when a site is being excavated, this is satisfactory but in exploring a large area before excavation, this is slow.

We hope to develop an electrical sonic device to use in conjunction with the present instrument. This instrument would be more mobile and, we hope, be able to locate with precision buried objects of various sizes at different depths.

While the primary object of our work at Cerro de las Mesas was to test the resistivity equipment, nevertheless the results obtained were of interest from an archaeological standpoint. In addition to the structures and artifacts indicated by the machine, a considerable quantity of cultural material was found incidentally in the trenches. Since detailed reports on the previous work at the site have already been published, it is proposed to present here only some new information and a few of the more interesting finds.

As a result of the work in 1941, we suspected that human sacrifice was commonly practiced at Cerro de las Mesas. Our recent excavations have done much to confirm this.

Artifacts found in our mound trenches were in the form of offerings, not grave furniture. Nevertheless, in many of the trenches, scattered burials were found without accompanying materials as though they were themselves offerings. It is unlikely that regular burial could have been given a poor person in a choice location like a ceremonial mound. In 1941, many burials of common people were encountered in the deeply buried refuse deposits. These usually had some small objects with them and the skeletons were in recognizable graves. In the previous expedition only one burial of an important personage was

*Time for a tamale break for our workmen from Paso del Bote. Food and drink are brought by the women and children of the village.*

*Section of a "psychoduct" consisting of telescoped pottery tubes, found in Mound 3. Both ends were cut through in ancient times.*

found in a mound. In this case the body was accompanied by rich offerings in the form of jade, shell, stone, and elaborate pottery vessels, as well as a number of what appeared to be human sacrificial victims.

The deposit of fifteen covered burial urns which we found in Mound 2 evidently represented a mass sacrifice, since all had been deposited at one time. Each contained the remains of a child or adult and nothing more. This particular deposit was reminiscent of the similar mass of pottery vessels found at the site in 1941, each of which contained a severed human head.

In Mound 3 at the north edge of the laguna, we found a series of skeletons one above the other through a depth of four meters. These were in all probability sacrifices, as there were no accompanying artifacts.

One of our most interesting finds was in this same mound where we encountered a pipe line consisting of eleven telescoped pottery tubes. Each end had been cut through in ancient times, so we could not tell where the line began or ended. The north end headed directly for the base of one of the standing stelae, while the south end tilted sharply upward just before it was broken off. This resembles very much the "psychoducts" which were occasionally constructed in Middle America to give the spirit access to and from the tomb. If this is the explanation in this case, the tomb, probably in the middle of the plaza, had been destroyed by new construction while the site was still occupied.

Perhaps our most important find was the offering encountered at a depth of one meter at the lower edge of Mound 2. The workmen first encountered two large, highly polished greenstone axes, set on end bits up. Just below these were three large fragments comprising half an ornate bossed incensario and a small olla which was covered by a small flat-bottomed bowl. On clearing the deposit and lifting the lid, it was seen that the olla was crammed full of carved stone objects. On top was the handsomely carved figure of a kneeling rabbit made from white limestone. The remaining objects consisted of ten stylized human figurines, nine carved from limestone and the tenth and smallest, of a bright green stone. There were also eight polished axes of jade and serpentine. The ten limestone figures are of particular interest, since they are Olmec in style. The little green figurine is done in an entirely different style and is ingeniously carved so that when inverted a different face is seen, the feet and legs becoming the headdress of the other figure. The reverse is also carved, so that a similar two faces can be seen.

The site of Cerro de las Mesas in general is post-Olmec, but we now suspect that it had its beginnings in late Olmec times and hence offers a good opportunity to study the transition from this earliest known Mexican civilization and the gradual development into the Classic period and beyond.

In the great jade cache discovered here by the 1941 expedition, there were included a number of typical Olmec jades which we felt might have been passed from hand to hand over many generations. In any event, mixed offerings of this type give ample ground for speculation. Offerings of jade or serpentine axes were a typical Olmec trait, as was the custom of placing them in the ground bit up. In this particular offering, the greenstone figure and the bossed incensario appear to be non-Olmec. Did the Olmec culture persist longer than we have thought, or were these long-treasured heirlooms?

During the course of our work, natives living within a radius of several miles daily brought us many specimens—figurines, pottery vessels and fragments, objects of stone, and the like. A point of much interest to us was the fact that the majority of these were of types not encountered in our excavations in the central group.

We think the central group, with its monument plaza, was the oldest in the region and therefore the most sacred. All of the material recovered from our trenches is early in type, while the trade objects from the neighboring mounds are not. It appears likely, therefore, that the numerous mound groups of the region represent a long period of development, many of them individually spanning a relatively short period of occupation.

The pottery from the early period, while often beautifully formed and decorated with geometric incised patterns or negative painting, is essentially monochrome: brown, red, black, or white. Following this, combinations of painted colors become more common, culminating in elaborate polychrome wares. This later development is well illustrated by our trade material. Pottery figurines of the early period are handmade while in the late periods molds were used in a sort of mass production.

In addition to fulfilling our main purpose of testing the electronic equipment, we feel that our excavations, though on a much smaller scale than those of 1941, have given us a better understanding of Cerro de las Mesas archaeology.

# Why I am a Mummy Duster

By E. N. BRANDT

*The Evening Volunteers were organized in 1953 by the late Frederic Douglas who was enthusiastic about the work a similar group had done at the Denver Art Museum and who realized the need for such help at our Museum. The group, limited to twenty-five people, is under the direction of Frances Eyman of the American Section, with assistance from others of the Museum staff. Mr. Brandt is a charter member—and a most faithful one.*

This term describes a dozen or two who work one night a week in the University Museum's workshop and storage rooms, cleaning and repairing the many objects needing attention. Actually I don't remember dusting a mummy, but we have done almost everything else—repairing Peruvian pottery, scouring and polishing metal weapons from Africa, and washing, sorting, and cataloguing hundreds of American Indian stone artifacts, among other activities.

When we are asked why we spend one night a week slaving at often menial tasks for no other remuneration than our own satisfaction and the coffee and doughnuts furnished by a grateful (I hope) Museum, we come up with various reasons. I can only give my own—and even these I find difficult to explain to quizzical friends and to my more lenient but equally puzzled family.

My first experience with archaeology and museums came close to being my last. As a boy in school on a farm in Virginia I found about fifty stone arrowheads, and was convinced I had made a great discovery. On a trip to New York I took my treasures to present to the American Museum of Natural History, anticipating their delight and gratitude. I was prepared to be hailed as a great discoverer and to be interviewed by *The New York Times*. Alas, a polite but obviously bored assistant curator thanked me. Then he pulled out drawer after drawer full of perfect arrowheads. He would, if I insisted, accept my offering; but as space was limited, wouldn't I please take them away?

That experience nipped my budding enthusiasm for archaeology. Years later I read E. G. Squire's *Exploration and Excavation in Peru,* and my interest in archaeology put forth new shoots. After reading all I could find on the Peruvians I started on the Maya, the Aztec, and so forth. Each presented challenging puzzles—the origin of each, the unconfirmed reason for the

Maya moving from one part of Yucatan to another, the extraordinary folklore of the Aztec, whose belief in the coming of a White God facilitated their conquest by Cortez. And then there are the unreadable Maya glyphs. Although the ones recording dates, mathematics, and astronomy have been deciphered, we cannot decipher the rest with any certainty.

Thus step by step I was brought to our own archaeology and its tantalizing enigmas. When and from where did man first come to the Americas? This is a fast-moving problem, not a static blank wall. It wasn't many years ago that no recognized authority would place man's advent at more than about four or five thousand years ago. Now many authorities will admit that even thirty-five thousand years is a possibility. Constantly new discoveries are being made and, armed with the magic yardstick of Dr. W. F. Libby's Carbon-14, our experts are pushing back the horizons of our knowledge. Perhaps tomorrow we will read of the gain of another thousand years.

Where did this first man come from and how? These questions are two more will-o'-the-wisps. I have neither the knowledge nor the space to explore all the theories, but they are many and varied, firing the imagination.

Once you get started exploring the past you are bewildered by the many challenges. What of the highly technical "lost wax" method of gold casting? Yet it was practiced by natives so little versed in physics that, as far as we know, they had no knowledge of the simple wheel. How did the early Peruvians learn weaving, in many respects superior to that done today? How, with no hard metal available, did the Peruvians and the Maya manage to produce such extraordinary masonry? The curved, sloping wall at Machu Picchu is an example. I have promised myself to take a weekend off, go down to Yucatan and find a Maya Rosetta stone. I can't imagine why this hasn't been done by now.

Surely these problems will be met and solved just as equally difficult ones have been solved by the determination and selfless labor of dedicated men. For archaeology isn't all artifacts, hieroglyphs, and dusty bones. Archaeology is rich beyond measure in the caliber of the men who, fighting ignorance and ridicule, have raised this science to its present high repute. Who can read, without being deeply stirred, of the persistency with which Schliemann pursued his dream that led to his triumph at Troy and Mycenae? Or read, without vicariously sharing, of the hardships of Stevens and Catherwood in the Honduras jungle when they opened to astonished eyes the spectacular ruins of the Maya? As you read, you struggle with Champollion as he finally masters the riddle of the Egyptian hieroglyphs, or with Ventris and Chadwick as they master Linear B.

These are but an infinitesimal few of the many stirring stories of the indomitable men who climbed the archaeological Peaks of Darien to show us a glimpse of new and far horizons.

Does that help explain the why of a Mummy Duster? Being one entitles you to feel yourself a private in the rear rank of the Army these generals led. When you think of it you stand nine feet high.

We Mummy Dusters are not expert, and often our inept efforts to be helpful must try the patience of the long-suffering members of the Museum Staff in charge of us. But they are kindly, dedicated folk cast in the mold of Job, which is indeed fortunate for us. They realize

that we are doing our best to help preserve the handiwork of the men of the past. No one can certainly foretell the future, but without a knowledge of the past not even an intelligent forecast can be made.

My knowledge is slight and scattered; in fact I'm cited as one who knows many unrelated facts about many unimportant subjects. But archaeology is an important subject, and I challenge my accusers to match the fun I've had gathering my unrelated facts as a Mummy Duster working in the sub-sub basement of the University Museum.

# A Faience Stela from the New Kingdom

*By* ALAN R. SCHULMAN

Among the unpublished finds of the University Museum's excavations at ancient Memphis in 1915-1923 is the faience stela shown here. It bears the Museum registration number E 13578 and measures 22 cm. by 25 cm. It was originally covered with a light blue-green glaze, which is still preserved in the upper right portion. Elsewhere the glaze has either disappeared or has undergone a chemical change, its vitreous sheen having vanished and the color having changed to a red-black.

The scene represents a man, wearing a garb of a vizier of the New Kingdom, adoring two deities, the god Ptah, who stands beneath his canopy, and the goddess Maat (Justice), who stands behind the canopy. A three line inscription records the titles and name of the dedicator of the stela as "the prince and count, the god's father beloved of the god, the *sem*-priest, the high priest of Ptah, the governor of Thebes and vizier, Khaemwas." The god Ptah is identified in a one line caption as "Ptah, the Great One South of His Wall, the Lord of Ankh-towe [Memphis]." Of the caption of Maat, only the name remains. The vizier Khaemwas lived, according to the evidence of the contemporary papyri, during the reign of King Rameses IX of the 19th Dynasty (ca. 1138-1119 B.C.).

Faience was a favorite material of the Egyptians for all sorts of small objects, including amulets, beads, rings, scarabs, and shawabti figures. Stelae in faience, however, are comparatively rare. In a short period of research, I have found only ten published examples in the museums of Europe, although certainly others must also exist. The University Museum possesses two of them, that of Khaemwas, the vizier and high priest of Ptah, and a second discovered in the course of the 1929-1934 excavations at the Nubian site of Anibeh. This latter stela (E 14232), on display in the Upper Egyptian Galleries, was published by G. Steindorff *(Aniba,* Vol. II, text p. 67, plate 37b). It was dedicated to "the Chantress of Amun, Tanedjmet" by "her brother, who causes her name to live, the Count, Hor-nakht."

# EXPEDITION NEWS

## LEPTIS MAGNA

The Spring issue of EXPEDITION described a lack of success in the first attempts to locate a Phoenician level in the immediate area of the presumed harbor of the Romans and the Phoenicians before them. As the work progressed from April 26 to May 8 all of the trenches around this harbor and the sea front ultimately produced either massive Roman structures or the local water table. Then in a last nearly desperate drive to at least verify the existence of the suspected Punic colony, a series of sondages or small round vertical shafts, were sunk at the very edges of the earliest part of the Roman city. The sondage on the fringe of the First Century B.C. Forum revealed the substantial walls of a probable public building of typical Phoenicio-Punic construction. The associated pottery made it possible to assign a date at least as early as 600 B.C.

Although the reconnaissance expedition is officially over, some exploratory digging continues along the lines of the walls in hopes both of establishing the dimensions of the building and recovering more datable material. Heretofore very few Punic buildings have been scientifically excavated. Since the Museum excavators have located the major early Punic settlement at Leptis, it may be possible to expose a section not covered by valued Roman monuments and thus make a material contribution to the history of Phoenician colonization and Early Iron Age culture in the Western Mediterranean.

## TIKAL

Edwin M. Shook, Director of the Tikal Project, writes that the 1960 field season has been the most productive one to date. Highlights have been the discovery of three richly stocked tombs of important personages, another magnificent stela (Stela 31) of early date, a heroic-sized rock sculpture, and the remains of a Pre-Classic temple deeply buried beneath the North Acropolis.

He reports that one of the three tombs, Burial 23, below Structure 5D-33, was the first large Late Classic Period burial to be found in Tikal. The burial chamber was dug as a long, rectangular pit into bedrock. The pit walls were roughly plastered, then the floor was covered with textiles from wall to wall. A wooden litter bearing the body was lowered to the center of the pit floor and at least two jaguar skins covered the litter under the body. The body of the young man, evidently in his late 'teens, lay extended, head to the north, with his arms folded over his chest. He had evidently been painted with cinnabar from head to foot and probably had *Spondylus* shells attached to different parts of his clothing. A sponge cushion lay under his head, as well as a bit of seaweed. Coral, a stingray spine, fish vertebrae, and small shells were also

*Slate totem pole depicting the mythical animal ancestors of a Haida Indian family of British Columbia. Height, 23 inches. (Cast with hook for hanging, $9.00; with base, $10.00. Express charges collect.)*

One of the many reproductions of art and jewelry available through the University Museum Sales Department. These are exact duplicates of the originals in our collections; the plaster casts are made in our own workshop, the jewelry outside of the Museum but under our direct supervision. A catalogue is available; price fifty cents, prepaid. Write: Reproductions, Room 102, The University Museum, 33rd and Spruce Streets, Philadelphia 4.

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Reproductions

around the head. The upper front teeth were inlaid with disks of iron pyrites and brilliantly polished jade, and he wore a multiple-strand necklace of jade, pearl, and shell beads, interspersed with two magnificently carved jade pendants—one with incised glyphs on the back. Across his stomach were hundreds of small tubular and flat jade beads, apparently from a beaded ornament. On each side of the head were two small jade flares, each with a shell backing and a pearl bead in front. These were the ear ornaments. Over the body and the litter had been laid mats which protected them from the falling wet plaster, masons' tools, and plumb-bob as the Maya were adding the vault over the rock pit.

Twelve pottery vessels rested on a bench at the north end and were not covered with mats, so that the plaster splashed them much as if one stood under a plasterer or painter today. The tomb vault was built up and then capstones were added, with the last apparently being the center capstone, which was smoothed with plaster and painted with a large red cinnabar dot. Several layers of flint and obsidian chips were added as the fill was built up over the capstones of the tomb, and construction of the next pyramid and temple followed immediately.

## THE AUTHORS

FROELICH RAINEY ("Editorial: Archaeological Salvage in Egypt" and "Electronics and Archaeology"), Director of the University Museum since 1947, has done anthropological research in the West Indies and Alaska and is recognized as one of the foremost authorities on the circumpolar region. One of his responsibilities is the over-all planning of the Museum's expedition program and in that connection he has visited many parts of the world. The article on archaeological work in Egypt is a report of one such trip. He is particularly interested in the new archaeological techniques presently being developed: the use of electronic equipment, dating by the Carbon-14 technique, under-water exploration.

JANE C. GOODALE ("Sketches of Tiwi Children") has been assistant in the Department of General Ethnology of the Museum since 1950. She received her B.A. and M.A. degrees from Radcliffe College, her Ph.D. from the University of Pennsylvania in 1959. Her field experience includes two seasons of archaeological work in Arizona in addition to her ethnological work on Melville Island which provides the background for this article.

GEORGE F. DALES, JR. ("The 'Old Fort' at Lahore") has been a Research Assistant in the Near Eastern Section of the University Museum since 1958. He participated in the 1957-58 excavations at Nippur, Iraq and in the 1959 excavations at Hasanlu, Iran. This fall he will lead an archaeological survey of the Arabian Sea coast of West Pakistan for the University Museum. The purpose of this survey is to search for traces of coastal sea trade between the ancient Indus Valley civilization and the West. At the June 1960 commencement of the University of Pennsylvania, he received his Ph.D. in Near Eastern archaeology; the subject of his dissertation is *Mesopotamian Female Figurines: Their Chronology, Diffusion, and Cultural Functions.*

MATTHEW W. STIRLING ("Electronics and Archaeology") was Director of the Bureau of American Ethnology of the Smithsonian Institution from 1928 until his retirement in 1959. He has headed ethnological and archaeological expeditions in various parts of the United States, Europe, New Guinea, Central and South America. He directed twelve seasons of archaeological work in Mexico for the Smithsonian Institution and the National Geographic Society, and has recently returned from two months in Kenya, Tanganyika, and the Union of South Africa where he has been studying the Early Man locations of that area.

MATTHEW W. STIRLING, JR. ("Electronics and Archaeology"), a recent graduate of Penn State University, is interested in mathematics and electronics. He has travelled extensively in Mexico and Central America, visiting most of the major archaeological sites from the Mexican border to Guatemala.

E. N. BRANDT ("Why I am a Mummy Duster") was educated in Virginia and New York. He was a partner of Brandt and Brandt, literary agents in New York from 1919 to 1934 and since 1934 has been with *The Saturday Evening Post*, first as Associate Editor and recently as Senior Editor. He is a member of the Merion Civic Association and a director of the Merion Botanical Society.

ALAN R. SCHULMAN ("A Faience Stela from the New Kingdom"), student assistant in the Egyptian Section, obtained his M.A. in Egyptology from the Oriental Institute of the University of Chicago in 1958. He is working toward his Ph.D. in Oriental Studies at the University of Pennsylvania, the subject of his dissertation being *The Military Establishment of the Egyptian New Kingdom.* He is the author of a paper on *Horsemen and Riding in the New Kingdom.*

## SUGGESTED READING

### THE "OLD FORT" AT LAHORE


R. E. M. WHEELER, Five Thousand Years of Pakistan, *Royal India and Pakistan Society.* London. 1950.

PERCY BROWN, Indian Architecture, Vol. 1 (2nd edition). Bombay. 1949.

J. PH. VOGEL, Tile Mosaics of the Lahore Fort, *Archaeological Survey of India, New Imperial Series,* Vol. XLI. Calcutta. 1920.


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### CREDITS

PHOTOGRAPHS

SKETCHES OF TIWI CHILDREN: By Jane C. Goodale except page 13, top, which is by Carleton S. Coon. THE "OLD FORT" AT LAHORE: Pages 14 and 15, by The Archaeological Department of West Pakistan. ELECTRONICS AND ARCHAEOLOGY: By Matthew W. Stirling, Jr. WHY I AM A MUMMY DUSTER: By William Bertolet. A FAIENCE STELA FROM THE NEW KINGDOM: By Kendall S. Kleindienst.

MAPS AND CHARTS: Drawn by A. Eric Parkinson.

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## MUSEUM MONOGRAPHS

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[1949] SCHOOLDAYS: A SUMERIAN COMPOSITION RELATING TO THE EDUCATION OF A SCRIBE. S. N. Kramer. 19 pp. 4 pls. $.50.

1950 THE LANGUAGE OF THE PAPAGO OF ARIZONA. J. A. Mason. 84 pp. $1.00.

1950 EXCAVATIONS AT TEPE GAWRA (Vol. II). A. J. Tobler. ii + 260 pp. 182 pls. $10.00.

1951 CAVE EXPLORATIONS IN IRAN 1949. C. S. Coon. ii + 125 pp. 33 illus. in text. 15 pls. $1.50.

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1952 THE ARCTIC WOODLAND CULTURE OF THE KOBUK RIVER. J. L. Giddings, Jr. x + 144 pp. 43 figs. in text. 46 pls. $2.50.

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